Journal of Physics: Conference Series 2017 vol.927 N1

Electrical properties of titanium nitride films synthesized by reactive magnetron sputtering

Mohammed W., Gumarov A., Vakhitov I., Yanilkin I., Kiiamov A., Kharintsev S., Nikitin S., Tagirov L., Yusupov R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd. Reactive dc magnetron sputtering was employed to produce thin films of titanium nitride using titanium metallic target, argon as the plasma gas and nitrogen as the reactive gas. A set of the films was studied deposited on the Si, fused silica and crystalline (001) MgO substrates with various deposition conditions. The films deposited on the Si and SiO 2 substrates are polycrystalline while deposited at slow rate to the heated to 600C MgO substrate are highly epitaxial according both to XRD and LEED data. Electrical resistivity of the films was measured by means of the four-probe van der Pauw method.

http://dx.doi.org/10.1088/1742-6596/927/1/012036

References

[1] Naik G V, Schroeder J L, Ni X, Kildishev A V, Sands T D and Boltasseva A 2012 Opt. Mater. Express 2 478
[2] Pierson H O 1996 Handbook of refractory carbides and nitrides: properties, characteristics, processing, and applications (New York: Noyes Publications) 193
[3] Stone D S, Yoder K B and Sproul W D 1991 J. Vac. Sci. Technol. 9 2543
[4] Dimitriadis C A, Lee J I, Patsalas P, Logothetidis S, Tassis D H, Brini J and Kamarinos G 1999 J. Appl. Phys. 85 4238
[5] Kadelec S, Musil J and Vyskocil J 1992 Surf. Coat. Technol. 54-55 287
[6] Jin Y, Kim Y G, Kim J H and Kim D K 2005 Journal of the Korean Ceramic Society 42 45
[7] Talyansky V, Vispute R D, Ramesh R, Sharma R P, Venkatesan T, Salamanca-Riba Y X, Li L G, Wood M C, Lareau R T, Jones K A and Iliadis A A 1998 Thin Solid Films 323 37
[8] Niyomsoan S, Grant W, Olson D L and Mishra B 2002 Thin Solid Films 415 187
[9] Guo S Y, Shafarman W N and Delahoy A E 2006 J. Vac. Sci. Technol. 24 1524
[10] Lima L P B, Moreira M A, Diniz J A and Doi I 2012 Phys. Status Solidi C 4 1427
[11] Serro A P, Completo C, Colaço R, Santos F, Lobato da Silva C, Cabral J M S, Araújo H, Pires E and Saramago B 2009 Surface and Coatings Technology 203 3701
[12] Zgrabik C M and Hu E L 2015 Opt. Mater. Express 5 2786
[13] Mishra S K, Kumar R, Sreemany M and Pathak L C 2015 Journal of Materials Engineering and Performance 24 5013
[14] Zhang Q Y, Shaibo J, Ju J, Liu M, Cheng S, Ma Y J, Xiao J Y, Jiang X N and Ma C Y 2016 Crystal Growth & Design 16 4272
[15] Matsumura T and Sato Y 2010 Journal of Modern Physics 1 340
[16] Rietveld G, Koijmans C V, Henderson L C, Hall M J, Harmon S., Warnecke P and Schumacher B 2003 IEEE transactions on instrumentation and measurement 52 449